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SARDAR PATEL UNIVERSITY

M.Sc. (Genetics) – Third Semester Examination

Monday, 24th October, 2016

02:00 P.M. to 05:00 P.M.

PS03CGEN03: Genetics in Crop Improvement

Total Marks: 70

Note: (1) Figures to the right indicate marks.
(2) Draw a neat and labeled diagram, wherever necessary.

Q. 1 Choose the most appropriate answer from the four alternatives given: [08]

(i). Johanssen obtained commercially seeds of the..... of French bean.

(a) princess variety
(b) golden variety
(c) velvet variety
(d) dolly variety

(ii). In India every seed of Varalaxmi hybrids cotton is produced by.....

(a) hand emasculation
(b) pollination
(c) both (a) and (b)
(d) tissue culture

(iii). ..... method is most effective for the detection of haploids plants.

(a) morphological marker
(b) biochemical marker
(c) genetic marker
(d) all of them

(iv). Spontaneous production of haploids usually occurs through .....

(a) stem culture
(b) embryo culture
(c) meristem culture
(d) parthenogenesis

(v). Somaclonal variations are the ones.....

(a) caused by mutagens
(b) produced during tissue culture
(c) caused by gamma rays
(d) induced during sexual embroyogeny

(vi). The insect toxicity of BT resides in a .....

(a) large protein
(b) large lipids
(c) glyco lipids
(d) hormones

(vii). Heterozygous and homozygous dominant individuals cannot be differentiated with.....

(a) AFLP
(b) RAPD
(c) RFLP
(d) AP-PCR

(viii). Ideally distance between molecular marker and gene of interest or QTL is.....

(a) <7cM
(b) <50 cM
(c) <10 cM
(d) <5 cM

PTO

Q.2 **Answer any SEVEN from the following:** **[14]**

(i). Define heterosis.

(ii). Write the advantages of back cross method.

(iii). What do you mean by mutational breeding?

(iv). Define cybrids.

(v). Write a short note on pollen culture.

(vi). Write any three factors influencing somaclonal variations.

(vii). What do you mean by Bt toxin gene?

(viii). Define transgenic plants and write a short note on transgenic tomato.

(ix). Differentiate between RAPD and RFLP.

Q.3 **(a)** Explain in detail about pure line theory and procedure for pure line method. **[6]**

(b) What do you mean by male sterility in crops? Write various types of male sterility studied by you. **[6]**

OR

(b) Discuss in detail about importance of heterosis breeding in crop improvement programmes. **[6]**

Q.4 **(a)** Write a detail note on methods for isolation of protoplast. **[6]**

(b) Explain in detail about uses of haploids and dihaploids in crop improvement. **[6]**

OR

(b) Give a detail account on viability and plating density of protoplast. **[6]**

Q.5 **(a)** What is somaclonal variation? Discuss without *in vitro* scheme used for obtaining somaclonal variations in crop improvement programs. **[6]**

(b) Discuss various applications and disadvantages of somaclonal variation. **[6]**

OR

(b) Give a detail account on virus resistance in transgenic crops. **[6]**

Q.6 **(a)** Explain in detail about transgenic for quality improvement with suitable examples. **[6]**

(b) Write a note on marker assisted selection in crop improvement programs. **[6]**

OR

(b) Write a detail note on drought resistance in transgenic crops. **[6]**